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## CHAPTER 1

### GENERAL

Whenever work is done on or near the roadway, drivers are faced with changing and unexpected traffic conditions. These changes may be hazardous for drivers, workers and pedestrians unless protective measures are taken.

Drivers do not make a distinction between construction, maintenance, or utility operations. Proper traffic control and safety are needed for all types of work.

Part VI of the National Manual on Uniform Traffic Control Devices (MUTCD) is the national standard for all traffic control devices used during construction, maintenance, and utility activities. Part VII of the Ohio MUTCD contains comparable information and is the standard used by all governmental agencies in the State of Ohio.

As a matter of fact, establishment and use of the Ohio MUTCD is required by the Ohio Revised Code. It is applicable to all streets and highways open to public travel in the State of Ohio.

The Ohio Manual sets forth basic principles and prescribes standards for the design, application, installation, and maintenance of the various types of traffic control devices required for all work activities occurring on public streets and highways. Included are requirements for color, size, shape, location, and need for the devices.

In all cases, the guidelines in this Handbook and any traffic control plan should conform to, or be of higher standards than, the Ohio MUTCD. Adequate protection of the traveling public, workers, and pedestrians will dictate the measures to be taken, consistent with the information presented herein and in the Ohio MUTCD.

Two references (1 and 2) are of particular importance. Standard Highway Signs (Federal Highway Administration, Standard Highway Signs, Washington, D. C., U. S. DOT, 1979) has layout details for each of the standard signs in the MUTCD. The Standard Alphabets (FHWA, Standard Alphabets for Highway Signs and Pavement Markings, Washington, D. C., U. S. DOT, 1977) shows the size, shape, and stroke width of the various approved alphabets. These are available from the Federal Highway Administration, HTO-20, Washington, D. C. 20590.

This Handbook has been designed to be used with, but not to replace, the Ohio MUTCD and to explain how to apply appropriate standards to various work situations. It should be useful to anyone involved with planning, designing, installing, maintaining, and inspecting traffic control. The illustrations can be used for a quick guide for various examples of traffic control. Contained are guidelines varying from planning traffic control to fit the needs of a particular work activity to the reasons for keeping accurate records.

**A. Fundamental Principles**

Construction and maintenance areas can present unexpected or unusual situations to the motorist as far as traffic operations are concerned. Because of this, special care must be taken in applying traffic control techniques in these areas.

According to experience, the following principles and procedures tend to enhance the safety of motorists and workers in the vicinity of construction and maintenance work areas:

- Traffic safety in construction zones should be an integral and high priority element of every project from planning through design and construction. Similarly, maintenance work should be planned and conducted with the safety of the motorist, pedestrian, and worker kept in mind at all times.
- The basic safety principles governing the design of permanent roadways and roadsides should also govern the design of construction and maintenance sites. The goal should be to route traffic through such areas with geometrics and traffic control devices as nearly comparable as possible to those for normal highway situations.
- A traffic control plan, in detail appropriate to the complexity of the work project, should be prepared and understood by all responsible parties before the site is occupied. Any changes in the traffic control plan should be approved by an individual trained in safe traffic control practices.

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- Traffic movement should be inhibited as little as practicable.
    - Traffic control in work sites should be designed on the assumption that motorists will only reduce their speeds if they clearly perceive a need to do so. Reduced speed zoning should be avoided as much as practicable.
    - Frequent and abrupt changes in geometrics, such as lane narrowing, dropped lanes, or main roadway transitions which require rapid maneuvers should be avoided.
    - Provisions should be made for the safe operation of work vehicles, particularly on high-speed, high-volume roadways.
    - Construction time should be minimized to reduce exposure to potential hazards.
  - Motorists should be guided in a clear and positive manner while approaching and traversing construction and maintenance work areas.
    - Adequate warning, delineation, and channelization by means of proper pavement marking, signing, and use of other devices which are effective under varying conditions of light and weather should be provided to assure the motorist of positive guidance in advance of and through the work area.
    - Inappropriate markings should be removed to eliminate any misleading messages to drivers under all conditions of light and weather. On short-term maintenance projects it may be determined that such removal is more hazardous than leaving the existing markings in place; if so, special attention must be paid to providing additional guidance by other traffic control measures.
    - Flagging procedures, when used, can provide positive guidance to the motorist traversing the work area. Flagging should only be employed

when required to control traffic or when all other methods of traffic control are inadequate to warn and direct drivers.

- To insure acceptable levels of operation, routine inspection of traffic control elements should be performed.
  - Individuals who are trained in the principles of safe traffic control should be assigned responsibility for safety at work sites. The most important duty of these individuals is to insure that all traffic control elements of the project are in conformity with the traffic control plan and are effective in providing safe conditions for motorists, pedestrians, and workers.
  - Modification in traffic controls or working conditions may be required in order to expedite safe traffic movement and to promote worker safety. It is essential that the individual responsible for safety have the authority to modify conditions or halt work until applicable or remedial safety measures are taken.
  - Work sites should be carefully monitored under varying conditions of traffic volume, light, and weather, to ensure that traffic control measures are operating effectively and that all devices are clearly visible, clean, and in good repair.
  - When warranted, an engineering analysis should be made (in cooperation with law enforcement officials) of all accidents occurring within work zones. Work zones should be monitored to identify and analyze traffic accidents or conflicts. As examples, skid marks or damaged traffic control devices may indicate needed changes in the traffic control.
  - Work-zone accident records should be analyzed periodically to guide officials in improving work zone operations.
  - All traffic control devices shall be removed immediately when they are no longer needed.

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- The maintenance of roadside safety requires constant attention during the life of the construction zone because of the potential increase in hazards.
    - To accommodate run off the road incidents, disabled vehicles, or other emergency situations, it is desirable to provide an unencumbered roadside recovery area that is as wide as practical.
    - Channelization of traffic should be accomplished by the use of pavement markings and signing, flexible posts, barricades, and other lightweight devices, which will yield when hit by an errant vehicle.
    - Whenever practical, construction equipment, materials, and debris should be stored in such a manner as not to be vulnerable to run off the road vehicle impact.

**B. Driver Information Needs in Work Zones**

The usefulness of traffic control devices intended to assist motorists in guidance and navigation tasks depends on whether the devices satisfy a driver's need for information. Both the message content and the placement of the traffic control device must be carefully considered. Inappropriate messages and/or incorrect placement of signs, markings, and other traffic control devices can mislead and confuse the motorist.

In work zones there are usually three types of traffic control device message content. These include the warning of potential hazards, safe speed, and the lane or shoulder over which a vehicle should be traveling. Positive guidance principles should be considered when determining which traffic control devices will be used and where they will be located.

Research indicates that the more serious failures to meet driver needs result from:

- Providing contradictory or misleading information;
- Presenting a sign with inaccurate distance information; and
- Using nonstandard messages or using inappropriate standard signs.

**C. Training**

Each person whose actions affect maintenance and construction zone safety, from the upper-level management personnel through construction and maintenance field personnel, should receive training appropriate to the job decisions each individual is required to make. Only those individuals who are qualified by means of adequate training in safe traffic control practices and have a basic understanding of the principles established by applicable standards and regulations, including those of the Ohio MUTCD, should supervise the selection, placement, and maintenance of traffic control devices in maintenance and construction areas.

**D. Summary**

The following list of items can be used as general guidance for those involved with work-zone traffic control activities:

- To keep the motorist's respect and the agency's credibility, don't lie to the public.
- If work is not in progress or a hazard is not there, take down, fold over, or cover signs.
- If there is no need for channelizing devices, remove them.
- Do not tell drivers to expect a hazard that is not there. If you do, they may not believe other signs and devices used on the project.
- Do not assume that drivers and pedestrians will see or recognize the workers or the hazards in the work area.
- Maintain the controls as if every driver were approaching the area for the first time.
- Once you understand the philosophy of good work area traffic control, explain it to your workers or assistants so they can perform their work with a minimum of exposure to traffic, watching for problems, and reporting any damaged or missing devices.

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Information provided herein can be used to supplement local, state, and national standards and to cover more and different types of work sites than those illustrated in the Ohio MUTCD. However, it should be recognized that it is not feasible to cover every conceivable situation. The objective of this Handbook is to illustrate many of the typical work sites, particularly those of relatively short duration, and to describe many common conditions encountered. Good engineering judgment must be used to arrive at the best traffic controls for a particular work site, depending on the nature of the activity, location and duration of work, type of roadway, traffic volume and speed, and potential hazard.

Hence, Traffic Engineering Division should be consulted for assistance and guidance when dealing with non-standard circumstances.